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ALLOMETRY AND SPECIATION IN *ECACANTHOTHRIPS* BAGNALL

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Hood (1935) suspected that synonymous names existed within the genus *Ecacanthothrips*, in view of the extreme variability of the forecoxae he found in the males of *E. priesneri* Hood. To quote Hood, "similar variability is to be expected among its congeners and as this character has been used as a prime one in the definition of species, there can be little doubt that synonymous names exist in the genus. Several species such as *inermis, bagnalli, crassiceps, inarmatus* and *coniger* appear to be thoroughly distinct, but the remainder of the genus centering about *sanguineus*, requires careful study of a large series of specimens." A study of different populations of *Ecacanthothrips* has confirmed several facts concerning the speciation of this genus. Several species are on record, mostly described from uniques or a few isolated specimens such as *E. bryanti* Bagnall, *E. coxalis* Bagnall, *E. steinskyi* Schmutz, *E. fletcheri* Ramakrishna, *E. ramakrishnai* Ananthakrishnan, *E. erythrinus* Ananthakrishnan, *E. flavipes* and *E. priesneri* Hood—all in the opinion of the author, only synonyms of *E. sanguineus* Bagnall. These species were erected because of insufficient knowledge of the enormous variations exhibited by *E. sanguineus*, so extensive as to be almost unbelievable. The individuals in a population fall into a finely graded series, so that the two opposite ends of the series, the gynaecoid and the oedymerous forms are strikingly different. This being the case, such characters adopted in the speciation by the protologists of the species, such as the color of the body, head length/width index, head length/tube length index, the structure of the forefemora and

tibia, the coxal prolongation in the males, the number and position of the foretibia tubercles and *even the number of cones in the third antennal joint and the accessory setae of the forewings,* have been found to be very inconsistent in view of the enormous range of variation exhibited by the individuals *in a population from the same host.* The accompanying range of measurements and the figures provide ample data for confirming the invalidity of the species mentioned above and careful scrutiny will reveal that all these species fall within the range of variation exhibited by them.

It is my pleasant duty to thank the authorities of the British Museum of Natural History, London, for extending me all the facilities for studying their collection of Thysanoptera and also to Dr. H. Priesner of Linz (Austria) for having given me the privilege of examining his collection during my stay in Linz. My thanks are also due to K. S. Ananthasubramanian of this department for having helped me in the collection of several of the forms discussed below.

The present observations are based on the following material:

(1) 19 males and 12 females and numerous larvae from neem bark, Palghat, Kerala, S. India.

(2) 16 males and 12 females and numerous larvae in the decaying bark of *Moringa moringa,* Madras, along with several individuals of staphylinid beetles and the caterpillars of the moringa pest (*Eupterotes mollifera*). An interesting feature is that the females of *Ecacanthothrips* laid their eggs within the moulted skin of the caterpillar and eclosion and the coming out of the first instar larva were observed in the laboratory.

(3) 20 males and 15 females from within dried twigs of *Sesbania.* This seems to be an abode of this thrips; several clusters of 10–42 eggs were found within the crevices.

(4) 12 males and 10 females from the sheaths of the coconut palm, Madras.

(5) 8 males and 10 females from the sheaths of a palm, Madras.

That allometry exists in *Ecacanthothrips* was established by Hood even from the four males he had of *E. priesneri,* but he was unaware of the existence of the very many intergrading forms. As such, he described *E. priesneri* as a new species and also provided a tentative key for such species as *flavipes, bryanti, steinskyi, sanguineus, coxalis,* and *priesneri,* based on the color schemes of the forelegs and antennal joints 3–5, along with the proportionate lengths of joints 3–5. The present study has established beyond doubt that these are no longer tenable, being mere variations found within a population and while the majority of the individuals possess antennal joints 3, 4, and 5 brownish, some individuals

have the basal half of 3, 4, and 5 yellow, the rest brown. Again, the proportionate lengths of the antennal joints 3–5 in *steinskyi* and *priesneri* have been mentioned as being 123, 132, 126 μ and 140, 147, 144 μ respectively, but measurements of all the males within a population have proved the range in each case to be, 98–168, 126–172, and 112–168 μ.

From the point of view of body coloration, every grade from dark,

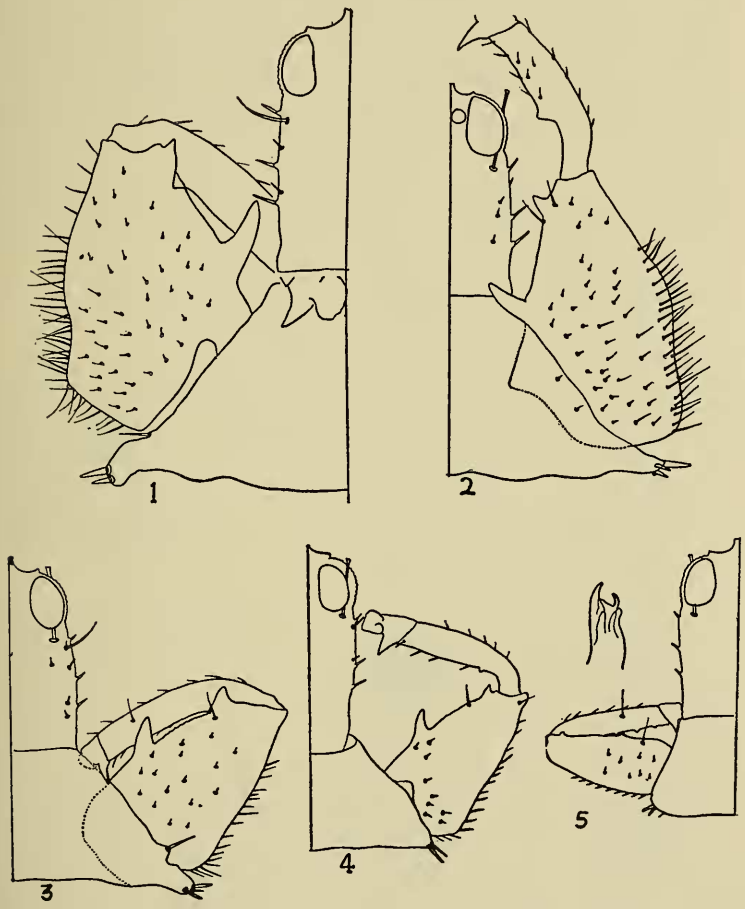

Fig. 1. *Ecacanthothrips sanguineus* Bagnall. 1.—Head, prothorax, and forelegs (on one side) of a maximum oedymerous male. 2–5.—The same, depicting the gradation in the reduction in the size of the forelegs. 5.—Gynaecoid male, with the side view of the apex of the pseudovirga. (All the setae on the forelegs are not shown.)

blackish brown without any trace of red pigmentation, through light brown with red pigmentation to almost entirely reddish individuals are met with. The number of cheek setae on raised prominences are constant for all the members in a population, three pairs being normally present. However, in all oedymerous forms and in those which show the tendency to be so, two or three pairs of smaller, accessory setae are present in between the three primary ones.

A significant feature is that the gynaecoid males, in general, appear so feebly developed as to lose all the typical male *Ecacanthothrips* characters, except for the genitalia. Practically all other morphological characters of the average male, not to speak of the oedymerous forms, are strongly suggestive of female traits: for example, a strong pronotum, strong forefemur and teeth, and particularly the absence of a coxal

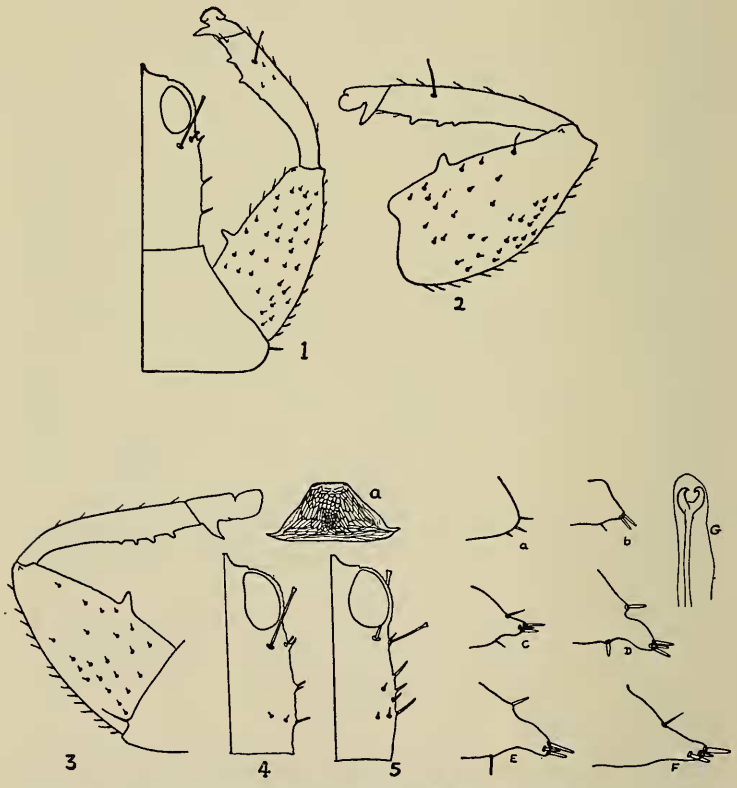

Fig. 2. *Ecacanthothrips sanguineus* Bagnall. 1.—Head and prothorax of female (one half). 2, 3.—Forelegs of female. 4.—Head of female (one half). 5.—Head of male (one half). a.—Pelta. a.–f.—Coxal prolongation. g.—Apex of pseudovirga.

prolongation. This is again confirmed by the fact that the gynaecoid males develop tibial tubercles beyond the middle region of the foretibia, a feature totally lacking in the normal and oedymerous males, but present only in the females. In the typical males, the proximal region of the foretibia is clearly concave and possesses one prominent tubercle while all the distal tubercles are not developed, or at most the inner margin of the foretibia is rugged. In the maximum oedymerous males, the outer margin of the forefemora at base tends to be clearly concave and is provided with a cluster of fine hairs. This concavity becomes progressively reduced along with the size and number of the fringing hairs as we proceed along the series, down to the gynaecoid individuals. Thus, in the gynaecoid males, the outer margin of the forefemora is normal, possessing a few weak setae and the proximal forefemoral tooth is very much reduced and the apical tooth hardly visible—features again suggestive of female traits. As such, speciation based on the forefemora possessing basally an excavated outer margin, provided with long, fringing hairs, becomes no longer tenable.

TABLE 1.—*Range of measurements in μ unless otherwise specified.*

	Males	Females
Total body length	2.240–4.228 mm	2.940–4.060 mm
Head, length	350–518	350–462
Head, width across eyes	210–280	224–280
width across cheeks	226–266	252–308
Postocular, length	112–172	112–154
Cheek spines, length: 1	14–28	14+
2	14–42	14–28
3	14–56	14–28
Antennal joints, length: 3	98–168	126–154
4	126–172	140–168
5	112–168	140–168
Antennal joints, width: 3	56–91	70–84
4	42–70	56
5	35–42	42–70
Prothoracic width at posterior margin (inclusive of coxae)	392–1022	420–700
Width of forefemora	126–378	126–280
Basal forefemoral tooth, length	28–140	14–56
Apical tooth, length	7–98	—
Number of accessory setae of forewings	12–25	15–19
Tube, length	168–280	172–266

(A very detailed account of the measurements of every individual in a population will be published elsewhere.)

Some males were also observed in the same population, with a body size range in between the gynaecoid and the oedymerous forms, but yet with poorly developed forefemora and coxae.

The range of variation shown by the number of accessory setae of the forewings and the number of sense cones on the third antennal joint ranging from 12–25 in either case, further confirm the invalidity of all the species.

Literature Cited

Ananthakrishnan, T. N. 1952. A new species of thrips—*Ecacanthothrips ramakrishnai* sp. nov. (*Thysanoptera tubulifera*) from South India. Proc. Indian Acad. Sci., 35(1) sec. B: 38–41.

————. 1957. Studies on Indian Thysanoptera IV. Zool. Anz., 159(5–6): 92–102.

Bagnall, Richard S. 1908. Synonymical notes; with description of a new genus of Thysanoptera. Ann. Soc. Belgique, 52: 348–352.

————. 1910. On some new and little-known exotic Thysanoptera. Trans. Nat. Hist. Soc. Northumberland, Durham, and Newcastle-upon-Tyne, n.s. 3: 524–540, Pl. 14.

————. 1915. Brief descriptions of new Thysanoptera. V. Ann. Mag. Nat. Hist., 15(8): 315–324, 2 figs.

Hood, J. Douglas. 1935. A note on heterogony in the Thysanoptera, with descriptions of two new species from Tanganyika. Stylops, 4(9): 193–201, 3 figs.

Priesner, H. 1930. Indomalayische Thysanoptera II. Treubia, 11(3): 357–371, 10 figs.

Ramakrishna, T. V. 1934. Notes on Indian Thysanoptera with descriptions of new species. Rec. Indian Mus., 36(4): 491–498, Pl. 9.

Schmutz, Karl. 1913. Zur Kenntnis der Thysanopterenfauna von Ceylon. Sitz. K. Akad. Wiss., Wien, 122(7): 991–1090, 5 pls.